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SOME PINEAPPLE PROBLEMS.

20th ARTICLE. - THE ROOTS AND STALK.

By Henry C. Henricksen.

The root system of the pineapple plant varies according to the physical condition and chemical composition of the soil. Also it is governed, to a very large extent, by the number of predaceous insects and parasites present in the soil.

A week or two after the plant is set, roots form on the lower part of the stalk, provided the soil is not too dry. These spread out to a distance of one to two feet at a depth of two to four inches. The first formed roots are slender, more or less branched. They increase in thickness with age and most of the branches die off. The later formed roots in loose well drained soil, are usually stout from the point of attachment with the stalk and very sparingly branched. Where the drainage is poor the roots are thinner and frequently branched. This is also, more or less, the case when the soil colloidal matter is deflocculated and the plants consequently small and pale in color.

The number of individual roots also varies according to soil conditions. In the more suitable soils a large plant may be well nourished with less than fifty roots, while in poorly drained or poorly flocculated soil a much smaller plant may have as many as one hundred roots as long as those of the former. It is evident, therefore, that an undeveloped root system is not always the cause of abnormal growth.

In comparing the stout roots of the favorably situated plants with the thin ones of plants in unsuitable soil the former are always thickly covered with root hairs, whereas the latter are very sparingly covered or even entirely naked. This may partly account for the difference in the plant's growth. Certainly the stout, unbranched, hairy type of root is the one indigenous to the plant when growing in its natural, semi-epiphytic state in rock crevices containing loose leaf-mold. This type of root is also able to persist where the other type succumb. The sucker root is an example. It serves as a support for the sucker by winding around the mother plant, but it also serves as feeding root when moisture is present in the leaf-bases of the mother plant. Moisture is not always present, however, but the root keeps alive even through prolonged dry seasons. That is, the stout hairy type of root is drought resistant and it is capable of absorbing moisture from a comparatively dry medium.

The depth of the root system is variable. Most of the roots are usually found in the upper ten inches of soil although some may go much deeper. The question is not of great importance from the standpoint of cultivation and fertilization. The fact is that the pineapple plant is a surface feeder and it should, in all cases, be treated as such.

When a plant is undersized or off-color the natural thing is to examine the root system. Such an examination may show that practically no roots are present. Perhaps not even stubs of roots are visible and often the stalk shows scars from knawing. The cause of such injury is usually the so-called white grub, Lachnosterna sp., the one attacking the sugar cane, and, if so, the grub will usually be there

as evidence. The changa, or mole cricket, causes some damage to the roots, but it is not nearly as serious a pest in pineapple fields as the grub. Changa injury is readily detected by the many scars visible on the lower leaf-bases. An application of sulphur as a remedy is advised as mentioned in Article No.10.

In some cases a few plants in spots, or all the plants in a field, turn reddish long before it is time for blooming. An examination of the roots may show that most of them are decayed from the tip, for a longer or shorter distance towards the base, with only the frayed ends remaining. This condition is usually caused by nematodes and it is very serious. This parasite is a microscopic worm, not readily detected in the soil, but a diligent search in the decayed roots usually reveals its presence. As a remedy for it, rotation is almost necessary. Also, it may be practicable to keep it in check by maintaining the pH of the soil fairly low as mentioned in Article No.10. Experiments are now under way in several infested fields in which various proportions of sulphur are being applied.

Occassionally, plants are found with roots, the tips of which are dead and with several branches of new growth springing from above the dead part. The cause of this may be chemical poisoning. At least it can be demonstrated in pot experiments that fertilizer salts or metal salts of various kinds will produce a similar effect.

Frequently, most of the plants, in a field, turn reddish in color after prolonged rains, especially so if the temperature is low. The cause of this is not root injury. The roots may remain in growing condition, but they are incapable of functioning normally in a water-soaked soil. If the condition is much prolonged root decay will take place and new roots of the thin branched type will form. These do not persist after the weather changes and the soil becomes excessively dry; therefore, such, seemingly temporary, changes may cause permanent injury to the plant.

THE STALK. - Aside from being a support for the leaves and roots, the stalk serves as a reservoir for material entering into the fruit. Therefore, it may be expected that the size of it will govern the size of the fruit. It does up to some minimal limit above which an additional increase is ineffective. That limit cannot be established absolutely for all plants, under all conditions, because of the many, varying, contributory factors. But it is evident from weights and measurements of many stalks that one measuring 2-1/2 inches in circumference, 7-1/2 inches long and weighing about 1/2 kilogram, will produce a maximum size fruit, provided other conditions are favorable. A stalk 2-1/2 x 6-1/2 inches, weighing 350 grams, is not liable to produce a size 12 fruit. On the other hand, one 2-1/2 x 9 inches, weighing about 650 grams, will not be liable to produce a size larger than 12. In fact, a stalk 2-1/2 x 13 inches, weighing more than 1 kilogram, may produce but a size 24 or 30. Therefore, the extreme stalk development seems to be superfluous for present practical purposes. It is the minimal limit in which the grower is especially interested for that is the determining factor in size of fruit. The stalk of a plant blooming at an age of 10 to 12 months is not large enough to produce a large size fruit. It usually measures less than 2 x 4-1/2 inches and weighs less than 150 grams, and the resultant fruit is usually a 36 or smaller.